Multidimensional Evaluation of a Program for Early-Career Researcher in Brazil – The Young Investigator in Emerging Centers Program

Fernando AB Colugnati, Ana Maria Carneiro, Sergio Salles Filho

Abstract— **São Paulo Research Foundation, FAPESP, has implemented an award program as a way to develop new research centers and to provide more opportunity to recent doctors, or productive doctors without regular job position, the "Young Investigator in Emerging Centers" (YIEC). This paper intends to present main results from an external evaluation of this program, covering a period from 1996 to 2006. Results found in this evaluation evidence that YIEC has reached some of targets, mainly concerning the research activity in private institutions. This program was a very important instrument to create the basic infrastructure for research activities in this type of HI opening new opportunities to recent doctors. The creation and improvement of research groups out of the excellence axe also should be highlighted, since it is one of the main goals. In general, the impact in institutions could be considered expressive, since that even new graduation courses were created, and the impact in post-graduation programs was expressive, improving and creating new disciplines and courses.**

***Index Terms*— Early-Career Researcher, impact evaluation, program evaluation,**

I. Introduction

SINCE middle 90´s Brazil started a rapid growth in absolute and relative numbers towards academic titles, mainly the number of new doctorate programs and consequently the number of new doctors. A recent national survey presents these highlighting indicators from 1998 to 2008 [1]. Within this 10 years interval, the number of doctorate programs increased 69%, from 782 to 1320. Meanwhile, the number of doctors has jumped from 3797 to 10705 new doctors every year, an impressive close to threefold growth. In terms of regional concentration, São Paulo state is the biggest in concentration of new programs, as well as new doctors, responding to 47% of national doctorate programs and 54.8% of doctors formed in São Paulo institutions.

As immediate consequence, the market should be capable to absorb these qualified human resources. From the same survey introduced before [1], it is possible to understand where those doctors are employed, and even if they are. In 2008, in average, 75% of doctors formed five years before or more where formally employed, while this number decreases to 66% for younger doctors. From those employed, 76.8% works on Education, i.e., they work as faculties, being the rest researchers in non-educational institutions. Again, there is a high regional concentration in São Paulo, which hosts 42.8% of all employer institutions.

Among those doctors without formal job position there are early doctors that have faced different sorts of barriers to start their careers:

- Higher education institutions are not capable to absorb the large quantity of new recent doctors;
- The highly specialized background can be an obstacle for the doctor in the work market, precisely because the national industry does not need this level of specialization;
- Many recent doctors extend their academic activities in R&D or education as research fellows, associate researchers, research assistants or post-doctors, receiving fellowships and/or research funding. However, these positions cannot be considered a formal job in the host institution, according to Brazilian laws.

Another fact that calls attention is the structural change about the nature of academic institutions in the same period. Traditionally in Brazil the research scenario has been dominated by public universities, seen as excellence centers for education and researchers formation. Private institutions were focused mainly in higher education, having an inexpressive scientific and/or technological production. Even for those researchers formally employed in private institutions, approvals for research funding proposals were something very

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rare, maybe due a proposal reviewer's selection bias. In 1996 a modification in the current law for higher education, proclaimed by the Ministry of Education, stated among many other issues, a clear research focus to any higher education institution that wished to use the title of "university", demanding a minimum number of ⅓ of doctors among faculties, students advised in post-graduation programs and research activities, along with a satisfactory scientific production. This caused a great impact in the academic scenario, forcing private universities to invest in research and to open formal job position for doctors. In 1998, right after the law promulgation, private universities hosted 8% of doctorate programs, while in 2008 this number was 11.2%, have graded 342 doctors in 1998 and 1022 in 2008.

Having the described scenario for doctors in Brazil, FAPESP, the São Paulo Research Foundation, has implemented an award program as a way to develop new research centers and to provide more opportunity to recent doctors, or productive doctors without regular job position, the "Young Investigator in Emerging Centers (YIEC)". This paper intends to present main results from an external evaluation of this program, covering a period from 1996 to 2006. This evaluation seeks to complete a first one done by Pian and Menegini [2].

II. Program Introduction and Historical Background

The Young Investigator for Emerging Centers award (YIEC) was implemented in 1995 and started its operation in 1996, aiming mainly to enable adequate job posts to researchers with high scientific potential, preferably in emerging research centers, fostering the nucleation of new research groups and decentralizing the state of São Paulo research system, mostly concentrated in few cities that host traditional public universities.

Despite the name "Young Investigator", the Program does not define any limit of age. The term young refers to two things: someone who is starting his/her career as a researcher, and/or someone who is starting research in a new area of knowledge. This can be roughly defined as a researcher owning a doctorate title, with expressive scientific and/or technological production that, preferably, seeks to develop his/her research out of the traditional area/institutions, the so called Emerging Centers. However, the Emerging Centers definition is also a broad one; it can be characterized either by new institutions or new research field in a traditional institution. These characteristics are not mandatory but desirable, and it is further recommended that the host institution should be other than that he/she attended the doctorate. As can be seen, the program covers a great variety of situations.

On the other hand the program has well defined targets that make it distinguishable to any other program granted by FAPESP, which can be summarized as:

- Concession, under a trade-off among resources, merit and actual demands that could make feasible, in a short time spam, satisfactory job conditions;
- Priority to less traditional and consolidated research institutions;
- Possibility to provide fellowship to researchers without a formal job position in the host institution;
- Introduction of new research fields in well established research institutions.

The grant is provided as a research funding, up to 4 years, and this does not require a formal job position in the institution, since it is possible to ask for a fellowship, again up to 4 years, which amount is quite competitive considering similar positions in public or private research institutions.

III. Methods

A. Data Available and Instruments

FAPESP owns a database that stores information about all grant proposals and ongoing projects, regarding submissions, research process and the final accountability. This database was used for design and operational purposes as well as analysis, since it contains all information about the institution, the researcher, amounts of grants and funding. We call this as the Input Dataset, used to describe program evolution, regional distribution and researcher profile.

However the agency does not maintain a continuous system for monitoring and evaluation, information about outputs and outcomes of the program are not available. Thus a survey was planned and conducted to perform an impact evaluation, based on a methodology described herein. The use of surveys for ST&I programs evaluation is criticized mainly under the risk of underestimation of impacts argument [3]. According to these authors surveys cover program or project participants as the main tool for data collection and end-users of the research findings are rarely consulted, resulting only in foreseeable indicators and overlooking indirect effects, leading to the so called iceberg model, i.e. besides direct effects, there are social and economic indirect effects that refer to non-participants.

To define what has to be evaluated, it is highly recommendable the realization of Panels with specialists. In the present evaluation study, besides the panels, which are part of the methodology, the survey focused on the researcher awarded, the Young Investigator (YI), and on the Hosting Institution (HI), always represented by the person in charge of the project hostess, as an attempt to minimize the submerse part of this iceberg.

To design the instruments for indicators collection, the Multidimensional Decomposition Method was used [4,5], enabling the program objectives to be decomposed into themes, indicators and metrics for the purposes of evaluation. Figure 1 shows the flow of activities comprised in the decomposition method. From the main program objectives depicted in the Introduction, five themes could be defined:

Theme 1: Access to the YI award
Theme 2: Researcher profile
Theme 3: Research groups nucleation
Theme 4: Technical and scientific production
Theme 5: Training and competencies developed

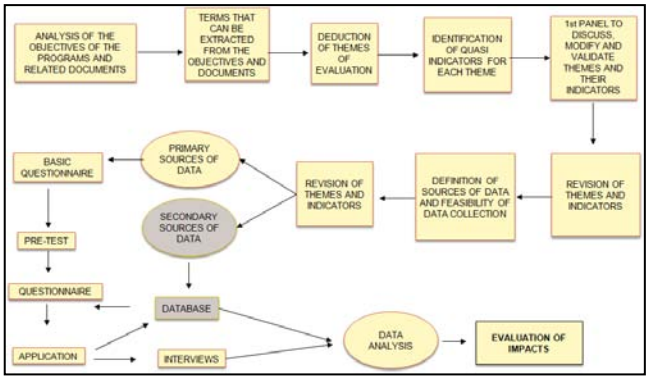

Fig.1. Flow of activities comprised in the Multidimensional Decomposition Method

Each of those themes was decomposed in indicators and their metrics. Then two structured questionnaires were developed to collect outcomes and outputs from both sides, YI and HI. These instruments were submitted to a panel of specialists as well as to field pre-tests to adequate question semantics, instrument structure and to detect indicators that could be hard or even impossible to collect, such that after 4 rounds of tests the final version was achieved, and then web interfaces were produced for online completion.

B. Sample of respondents

This evaluation tried to cover the whole universe formed by all finalized projects from January of 1996 until December of 2006, providing the total of 393 projects. After exhaustive search and contacts made by the team by e-mail and phone calls, 383 YI were found and 343 responsible from the HI, giving a universe of 340 YI-HI matches. From this universe, the final sampling comprised 299 YI´s (78%) and 258 HI´s (74%), a result that can be considered successful for this kind of survey. 217 presented answers from both sides, 82 only from YI and 41 only by the HI.

1) Strategy and Methods for Analysis

São Paulo is one of the biggest states in terms of number of municipals, 645 divided in 14 administrative regions according to the Brazilian geo-political division, but with a high concentration of universities and research institutes in six cities that hosts more than 80% of these institutions. As described in the program objectives, one of the aims is to consolidate institutions outside the already recognized excellence centers, so the comparison of indicators between institutions from this main research excellence axe and the ones in other cities of the state is one of the goals of this analysis.

Another fact that must be considered in terms of consolidation of new centers is the nature of the institution, if Private or Public. In Brazil, excellence research institutions are traditionally the public ones, being federal or state institutions and the YIEC has been seen by FAPESP as a way to develop research in private universities, which presented a remarkable growth in the number of new institutions since the end of the 90´s. To give an idea, in 2009, 89% of higher education institutions were private, and 90% of them are in São Paulo.

Having this in mind, the analyses of main indicators along the evaluation will consider the comparison of four strata formed by the combination of the two strata described above: Region of the HI (In the excellence axe x Out of the excellence axe) and Nature of the HI (Public or Private). For the sake of readiness, these combined strata categories will be denominated Public or Private In-HI, and Private or Public Out-HI.

Statistical analyses comprised descriptive methods, based on tables and illustrative graphs, inside each theme, comparing the four strata. When possible and necessary, adequate confidence intervals were used and are described in the table and graphs legends. However, this kind of analysis does not take in account the complex dependence structure among all indicators from the themes defined. This dependence, or association, structure can evidence some sort of YI profiles that will help in the final interpretation of results. To assess these associations, Multiple Correspondence Analysis (MCA)[6] is used, followed by cluster algorithms over the optimal coordinates generated by MCA. The evidence of clusters of individuals (YI) defined by the association among the indicators categories, since interpretable, can describe the mentioned YI profiles.

Main findings of each theme are presented in highlights boxes in the beginning of each section and detailed in the sequence. The multivariate analysis is presented as the final result section.

IV. MAIN FINDINGS

A. Themes 1 and 2: Access to the YI award and Researcher profile

These themes are presented together due the complementary nature of their indicators.

The average age of respondents at the time of the award approval was 42 years old, having median of 35. About home institution and academic trajectory, 73% has concluded the doctorate in São Paulo state institutions, being 91% from public ones. Around 25% have obtained the doctorate abroad, mainly in USA (25% of them) and UK (18%). Great part of the grant holders has attended post-doctorate positions before the award (75%), the great majority in Brazilian public institutions (91%).

TABLE I
HIGHLIGHTS FOR THEMES 1 AND 2

1. The majority of YI are professionals with reasonable experience in the ST&I sector and research, having in average 42y (median 35), and having post-doctorate (72%);
2. They choose to submit projects for the YI award because of the YI program high qualification and recognition and the amount of grants, as well as because the possibility to have a job position in the HI;
3. However, 26% of YI were already employees of the institution, leading to the conclusion that for those, the main motivation is the independence in their research activities provided by the funding;
4. About researcher nucleation, 87% of the YI were already contracted or were contracted in the end of the project; about regional distribution, 97% stayed in São Paulo, and 77% in the same city;
5. Private institutions out of the excellence axe were the ones that most contracted the YI; public institutions out of the excellence axe were the ones that presented the biggest number of employees that received the award, and consequently they contracted less than the others. Curiously, YI from Private institutions in the excellence axe were the ones that most migrated to other institutions in the end of the project;
6. Also, the Private Out HI´s had the major rate of new research groups, whereas Public In HI´s presented the smaller rate;
7. Less than half of the YI´s asked for the fellowship, and FAPESP provided in average 90% of the total project budget.

Regarding the access to the award, from the input dataset is possible to assess the distribution of conceived and rejected grants, and compare this among the four strata. There is no evidence that approvals are more concentrated in any of the strata, having in average 40% of the proposals approved. However, looking at the historical series of approved proposals it is possible to note an irregular behavior between the excellence axes (Figure 2). In general, the majority of concessions were given to the In HIs, but a slight increase in the percentage of Out-HI is noted. Just in 1998 the Out-HI presented a higher proportion of approvals due the massive concessions to the UNESP, a São Paulo state university that has a decentralized structure, having campi all around the state, great part in cities out of the excellence axe.

About the motivation to submit projects to the YI award, 29% answered "*Expectation to fix up a position as employee in the HI*", 18% pointed out the value of the grant. Other motivations are "*Availability of fellowships*" (14.5%), "*Complementary benefits*" (11.5%) and "*Award reputation*" (11%). Having the possibility of job position as the main motivation, the choice of HI is a key issue. When asked about criteria to choose the HI, 23% stated that "*Previous contact with researchers or research groups in the HI*", 20% answered "*It is an emerging center in their research area*".

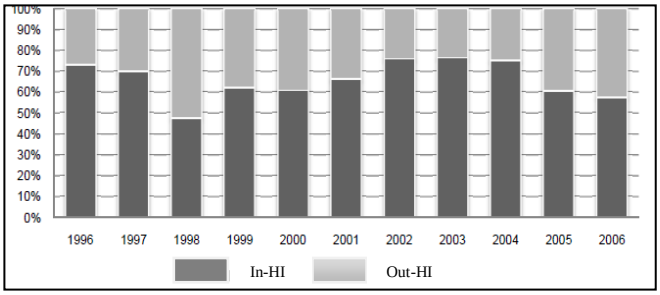

Fig. 2. Historical series for approvals in HI In and Out the excellence axe

The motivations and criteria seem to be very consistent when the employment situation at the time of the survey is analyzed. From 293 answers for this question, 26% declared that they have already been contracted by the HI before the award, and 42% was contracted by the HI. The institutions that most contracted researchers were the public ones, being at least 51% of them in the excellence axe. Detailing a little deeper the researchers' location, from those whose were contracted by the HI, 92% stayed in São Paulo state and 77% stayed in the same city. Even for those contracted elsewhere, 56% are still in São Paulo, and only 23% moved from the origin city. About migration between the excellence axes, 12% moved from the excellence to cities out of this, and 6% made the contrary path.

B. Theme 3: Research Group Nucleation

Around 88% of the groups were still in activity, from 267 research groups formally registered in the National Council for Scientific and Technological Development (CNPq) research groups' directory. This gives an average of 0.9 created/ improved groups per YI grant holder.

TABLE II
HIGHLIGHTS FOR THEME 3

1. 70% of YI´s created or improved research groups, 87% of those groups were still in activity until the conclusion of this evaluation;
2. The Private Out HI´s presented the higher number of new research groups;
3. 71% of those new groups were from the Exact and Earth Sciences (58), Biological Sciences (49) and Engineering.

The main contribution of YI grant to research groups were the possibility to open new research areas, investment in laboratory infrastructure and other facilities, and human resource training for research activities. These contributions were cited by both, the YI grant holder and the HI representative.

Exact and Biological Sciences sum up to 53% of all groups created or improved, reaching 71% if Engineering is included. Half of the groups focus eight sub-areas: Physics, Chemistry, Engineering of Materials and Metallurgic, Medicine, Biochemistry, Physiology, Electric Engineering and Genetics.

Figure 3 presents the proportion of YI that has created or improved research groups among the four analysis strata. It is noted that around 90% of Private HIs out of the excellence axe have created or improved groups, a little more than in other situations.

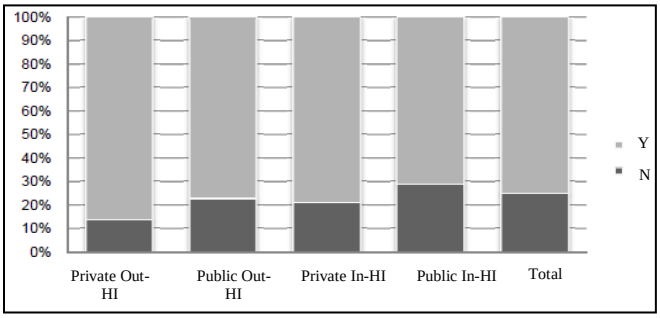

Fig.3. Creation and improvement of research groups across the four analysis strata. Y = yes, N = no.

C. *Theme 4: Technical and Scientific production*

Scientific production was classified in six different categories: abstracts in national and international conference proceedings, papers in national and international scientific periodic, book chapters and books. The questionnaire asked about the total number of publications since the beginning of the project, and then about the number of those which was strictly related to the awarded project. The proportion can be understood as a proxy for the award impact in scientific performance.

TABLE III
HIGHLIGHTS FOR THEME 4

1. The production increased in all strata since the YI award;
2. The performance, regarding publications and advising activities, were a little higher in the private institutions;
3. Comparing just Private and Public institutions, there is a higher dispersion in the distributions of number of high quality papers in Public HI´s, while in the Private HI´s this distribution is mores symmetric and homogeneous. This can be interpreted that Public HI´s present more outliers in terms of production, having researchers that publish much higher or lower the average;
4. 9 projects submitted and/or published 14 papers in Nature or Science journals;
5. 63 generated innovation;
6.

As can be seen in table IV, YI have focused primarily in international publications, either proceedings or journal papers. When counting just the publication related to the project there was a huge production, totalizing 5000 texts in conference proceedings, 42 books, 211 book chapters, 583 papers in Brazilian journals and 1988 articles in international journals. This gives an average of 5 articles in national journals and 15 in international journals since the beginning of the project, per YI, among the 227 respondents for this questionnaire item. Regarding articles strictly related to the project, the average is 2.5 and 7.4, for national and international journals respectively. Taking ratio of these averages as the proxy for the YIEC impact, it can be said the award have increased in 50%, approximately, the scientific performance of grant holders. Figure 4 presents these estimated ratios across the four analysis strata, and their 95% confidence intervals. The impact for international publication is quite higher for the Private Out-HI, 73%, and statistically different from the 42% for the Public In-HI, since their confidence intervals do not intersect. This fact can be explained mainly because the YI award was a fundamental mechanism used by the private HI to start research groups, while the Public In-HI already have had consolidated groups and senior researchers, despite the award. It is interesting to note, also, the focus in international publications. The Brazilian agency responsible for research and post-graduation programs evaluation, CAPES, uses the number of publications in indexed journals as one of the main performance indicators, indeed taking the impact factor in account, when available. This kind of evaluation has made Brazilian researcher to direct all their efforts to this kind of high quality scientific periodic, since few Brazilian journals are indexed.

TABLE IV
NUMBER OF SCIENTIFIC PUBLICATIONS, TOTAL FOR THE YI, PUBLICATIONS SINCE THE BEGINNING OF THE AWARDED PROJECT AND PUBLICATIONS STRICTLY RELATED TO THE AWARDED PROJECT

	Total		*Since award begining*		*Strictly related*	
	Sum	**Mean**	**Sum**	**Mean**	**Sum**	**Mean**
National proceedings	10603	44.6	6522	27.6	3133	16.5
International Proceedings	5695	23.2	3729	15.5	1968	8.6
Books	171	0.9	135	0.7	42	0.3
Bokk chapters	848	3.8	583	2.8	211	1.1
Brazilian journals	2007	8.0	1288	5.3	582	2.5
International journals	6446	23.9	4129	15.4	1984	7.5

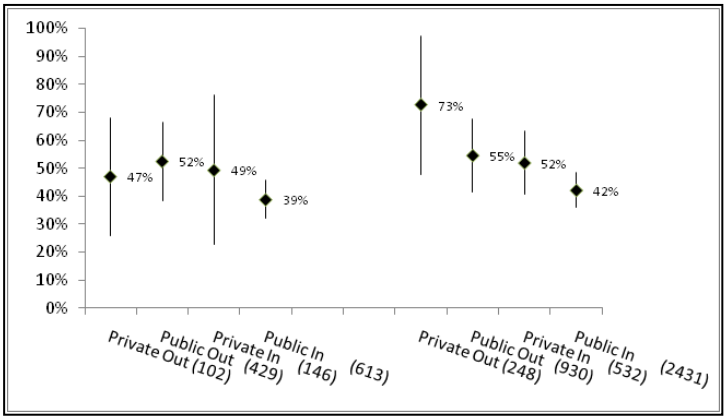

Fig.4. YI award impact for scientific performance. Articles published in Brazilian and International journals.

About advising activities, 92% of the grant holders reported to have advised students in any academic activity, undergraduates, graduates, doctorates and post-doctorates. The higher number of advising is in undergraduate scientific initiation, 1562, followed by Graduate/ Master dissertations, 1011. But even for doctorate and pos-doctorate, these numbers are substantial, and in agreement to the HIs´ opinion about the role of YI in academic advising.

The YI award program is not driven to technology and innovation production, nevertheless it is desirable if applicable to the project field. Despite the program scientific focus 103 of those results have become innovation, according to the Oslo

Manual definition, presented in the questionnaire for the respondents. From these 103 innovations, 58% reported Scientific Knowledge Advance as innovation, that is not in agreement to the manual used, and just 20% being Products or Software. Also, copyrights number is quite low relative to the number of declared innovations, such that only 35 patents were registered. In general, these rights did not provide any economic or financial return, neither to the HI nor to the YI, and they do not expect any, though.

D. Theme 5: Training and Competencies Developed

The major impact in this theme concerns the fostering in the HI´s post-graduation programs, especially regarding the creation of new disciplines, confirmed by 77% of the HIs and 70% of the YIs. However this impact was considered minor for graduation courses, indicated by 45% of the YI and 64% of the HI. Despite the fact that less subjects responded positively to this impact, it is still very important, since it is not expected according to the main goals of YIEC. It should be highlighted that 3 projects have contributed to the creation of 6 new graduation courses.

TABLE V
HIGHLIGHTS FOR THEME 5

1. To 70% of YI´s and 77% of HI´s, the award has impacted in the post-graduation programs, especially in the creation of new disciplines and courses;
2. 55% of YI´s and 64% of HI´s stated the award impact in undergraduate courses;
3. 16% of YI´s have formalized cooperation partnership with other institutions due the award, totalizing 78 partnerships with national institutions and 82 with international partners

The projects executed by the YI had, in its total, a collaboration of 3583 persons, half of them with post-graduation title, and the rest being undergraduates, technicians and interns. 77% of them were HI fellows, but claims attention the participation of post-doctorates from other institutions, an indicative of new partnerships.

Analyzing new competencies developed in the HI due the YI award, 75% of the grant holders declared that the award had a higher contribution for the development of R&D activity in the HI, followed by the Ability to work in group (65%) and Project Management (40%). From the side of HI, besides the same competencies declared by the researchers, the Knowledge of new funding sources (58%) deserves highlight.

V. MULTIDIMENSIONAL PROFILES OF YT´S

Aiming to describe profiles of YI´s regarding mainly productivity and research nucleation, a multivariate analysis was performed, applying Multiple Correspondence Analysis and clustering algorithms.

Multiple Correspondence Analysis (MCA, also called Principal Components analysis of qualitative data) is a statistical technique for analyzing high dimension cross tables, providing some measures of correspondence among the categories of the variables in row and columns. The results are analog to those on factor analysis. However, whereas conventional factor analysis determines which variables cluster together, MCA determines which variable categories are close together. MCA provides a graphical representation, a map, where this associations of categories can be visualized and interpreted, given a set o coordinates, an analogue measure to the factor loads in Factor Analysis. Furthermore, as in factor analysis, it is possible to determine clusters of subjects, as a direct result from the cluster of categories. In other words, subjects that have the similar response profiles will be positioned close together in the subjects' correspondence maps. The clusters, if interpretable, can be consolidated by Cluster Analysis using some clustering algorithm (ref). To obtain an accurate classification of subjects in clusters, the k-means hierarchical cluster algorithm was applied over the map coordinates provided by the MCA. The following variables where used:

1. *If asked for fellowship (Yes x No)*
2. *Criteria used to choose the HI*
3. *Motivation to ask for YI award instead of another type of grant from FAPESP;*
4. *Employment situation;*
5. *Hypothetical situation if the award have not had been given;*
6. *If improved or created research group;*
7. *If improved or created courses and/or disciplines in post-graduation programs;*
8. *Average time, in hours, spent in research activities;*
9. *Average time, in hours, spent in lecture activities;*
10. *Number of publications in qualified journals (categorized in "At least 1", "2 to 4", "5 to 9" ans "10 or more", for Qualis A and Qualis B qualification[1];*
11. *The percentage of papers originated exclusively from the activities of the project awarded, from the whole production of the YI since the beginning of the project (a proxy for impact in production). Two categories were used, "Less than 50%" and "50% or more";*
12. *Number of advised students, categorized in "1 student", "2 to 4", "5 to 8", "9 or more". Graduating, doctorate and post-doctorate advising were included.*

Figure 5 presents the dendogram for the clustering algorithm, clearly evidencing 4 groups. It is possible to describe the groups' profile analyzing the variable categories that most contributed to the clustering, such that they are more frequent inside the group and less frequent outside it. The clusters were them interpreted and are described below.

[1] Qualis is a Brazilian classification for the quality of scientific journals developed by CAPES (coordination from the Ministry of Education for higher education fostering), ranging from A to D, being A the best quality.

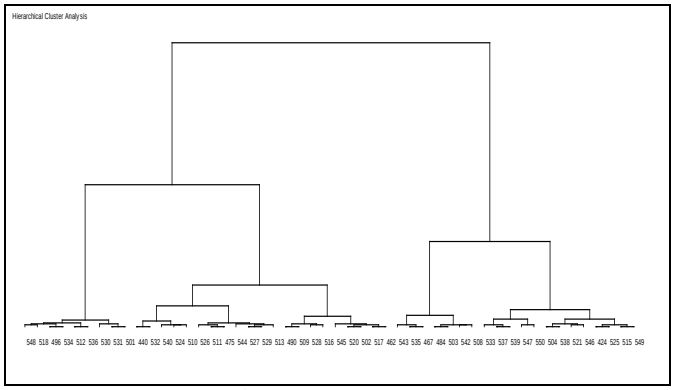

Fig.5. Dendogram resulted from the cluster algorithm k-means.

Cluster 1 – Fellowship not committed to the HI: This group comprises 23% of the sample. This cluster is dominated by YI that have asked fellowship, but did not contributed too much for the HI. They did not create or fostered research groups, have advised just one student, did not create any new research area, new discipline. They choose the HI because the localization or because they already have had contact with already established research groups. Also, they present a poor academic performance. Most of them were contracted by other institution, rather than the HI, after the end of the fellowship.

Cluster 2 – Fellowship committed to the HI: 35% of the sample is classified in this group. These YI have dedicated 20 to 40 hours/ week for research activities, have published 5 to 9 articles in high level journal, and impacted in the post-graduation programs. These YI have been contracted by the HI after the end of the fellowship.

Cluster 3 – Less productive employees: In this case, the YI were already formal employees in the HI, they did not ask for fellowship. However they do not have the expected involvement with the HI, with inexpressive advising and research activities and poor academic performance. They are 12% of the whole sample

Cluster 4 – Very productive employees: 30% of the sample, they are very productive researchers, resulting impacts in post-graduation programs, creating new disciplines, advising students and publishing in high quality journals.

It is clear that the employment situation at the time of proposal submission and general performance were the discriminative axes for the clusters. Claims attention the fact that bigger clusters are those formed by more productive researchers, summing up 65%, allowing to state that the YI award program really supports researchers with high academic and scientific potential.

Having this distinct groups formed by outcomes and outputs, the next step is verify the distribution of these four categories across the four analyses strata defined before, presented in Figure 6. The remarkable fact is the higher proportion of clusters 2 and 4, the most productive researchers, in institutions out off the excellence axe. In the case of private, the predominance is contracted researchers, cluster 2, while in public institutions there are more fellowships. This can be explained by the fact that in public institutions the formal contract is made by a selective process, once the institution has the permission from the government to open a new position, a not so simple issue since it depends on the state or federal budget, policies and other issues.

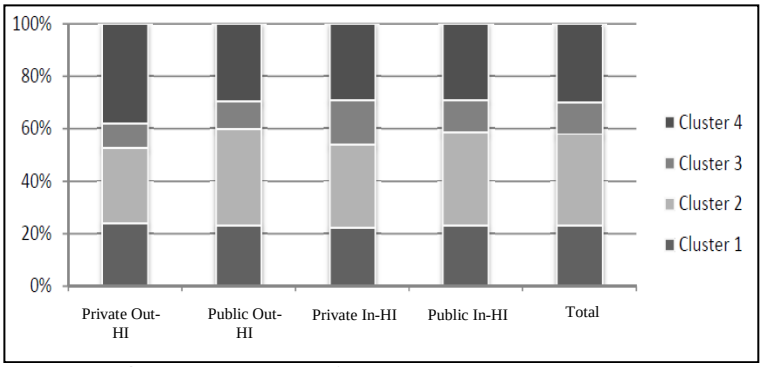

Fig.5. Clusters´ distribution across the four strata analysis.

VI. DISCUSSION

This paper presented some results for the evaluation from the Young Investigator in Emerging centers program, granted by FAPESP, the São Paulo state research foundation.

Some other programs can be cited, sharing the same targets, in Brazil and abroad. In Brazil the PRODOC program from CAPES, coordination from the Ministry of Education for higher education fostering, had it first call in 2004 (http://www.capes.gov.br/bolsas/bolsas-no-pais/prodoc). The targets are very similar to the FAPESP program, but giving more focus on education rather than only in research. In United States, the CARERR program support recent doctors up to 5 years, trying also to increase participation of those institutions traditionally underrepresented in science and technologic scenario [7]. In Germany, the Emmy Noether Program also tries to fund excellent young researchers in postdoctoral phase as an alternative path to the traditional way to reach professional qualification [8]. Comparisons among countries related to academic pathways to reach a professorship, or even about doctors' employment opportunities, are always hard to do since academic relationships, educational systems are very different and presents political and cultural aspects.[2]

Results found in this evaluation evidence that YIEC has reached some of targets, mainly concerning the research activity in private institutions. This program was a very important instrument to create the basic infrastructure for research activities in this type of HI opening new opportunities to recent doctors. The creation and improvement of research groups out of the excellence axe also should be highlighted, since it is one of the main goals, nevertheless just 12% of researchers from the excellence axe have moved to Out-HI. In general, the impact in institutions could be considered expressive, even new graduation courses were created, and the impact in post-graduation programs was expressive, improving and creating new disciplines and courses.

[2] The authors are carrying on a comparison study among YIEC and the programs cited above, and results should be presented soon.

Looking at the grant holders, it is clear the seek for excellence in terms of scientific production from researchers hosted in private institutions, and it is evident from performance indicators that YIEC has had a great impact on this performance, impacting in average in 50% of the whole scientific production. However some researchers did not reach the expected performance and engagement, as was evidenced by the cluster analysis. Some reasons were pointed out in a question from the questionnaire where they were free to post any comment. They argued that in some cases the HI forced them to assume too many disciplines and lectures, leaving the research activity in second plan.

Further analyzes and comparisons to other similar programs are still in course, and there is a purpose to develop a monitoring system to FAPESP based on some of the analyzed indicators that presented more evidences as good representatives to the program targets, providing an objective updated evaluation for program managers.

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